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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/665,897	09/18/2003	Peter J. Hopper	NSC1P282/P05730	6996
22434	7590	04/07/2006	EXAMINER	
BEYER WEAVER & THOMAS LLP			ROSE, KIESHA L	
P.O. BOX 70250			ART UNIT	
OAKLAND, CA 94612-0250			PAPER NUMBER	
			2822	

DATE MAILED: 04/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/665,897

Applicant(s)

HOPPER ET AL.

Examiner

Kiesha L. Rose

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,6-16 and 26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,6-16 and 26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

This Office Action is in response to the request for reconsideration filed 26 January 2006.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1,6,7 and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (U.S. Patent 6,483,147) in view of Lee et al. (U.S. Patent 6,081,037).

Lin discloses a silicon-on-insulator device (Fig. 8) that contains an active semiconductor layer (32), a MOS transistor (42) or other forms of transistors formed in the active silicon layer, a bulk silicon layer (12) having a first surface and second surface, an oxide layer (34) formed between the active silicon layer and first surface of the bulk silicon layer, a heat sink (38) formed in the bulk silicon layer and configured to sink heat sourced through the oxide layer to the second surface of the bulk silicon layer, where the plug shape heat sink is a thermally conductive metal material (tungsten-titanium) and the plug has a length substantially the same size as the thickness of the bulk silicon layer and has a circumference ranging from 1 to 50000 microns and where

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the silicon-on-insulator is formed on a semiconductor wafer or die. Lin discloses all the limitations except for the thermally conductive material to be a thermally conductive paste. Whereas Lee et al. discloses semiconductor device that contains a thermally conductive material that is a thermally conductive paste. In addition Lee discloses a chip and a heat spreader thermally coupled to each other by a thermally conductive paste (epoxy) for a thermal conduction path for dissipating heat. (Column 4, lines 46-65) Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Lin by incorporating another thermally conductive material to be a thermally conductive paste for a thermal conduction path for dissipating heat as taught by Lee.

Claims 8 and 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin and Lee in view of Mitani et al. (U.S. Publication 2003/0057491).

Lin and Lee disclose all the limitations except for an isolation region and the orientation of the semiconductor material. Whereas Mitani discloses a semiconductor device (Fig. 3) that contains a bulk silicon layer (1a), an oxide layer (2a), a active silicon layer (3a), a transistor and isolation regions (4) formed around the transistor and contacting the oxide layer, where the bulk silicon layer, oxide layer and active silicon layer have an orientation of 100,111 or 110). The isolation regions are formed around the transistors to act as element isolations to separate other transistors or elements from each other. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Lin by incorporating an isolation region to act as a element isolations to separate other transistors or

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elements from each other as taught by Mitani. In regards to the orientation, it is well known in the art to have semiconductor materials formed of orientations 110, 111 or 110 as disclosed in the Mitani reference.

Claims 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin and Lee.

Lin and Lee disclose the claimed invention except for a plurality of transistors and heat sinks. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a plurality of transistors and heat sinks, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. (St. Regis Paper Co. v. Bemis Co., 193 USPQ 8 1977) In addition the Lin reference discloses that there is at least one heat sink or transistor so that discloses a plurality of transistors and heat sink. (Column 2, lines 15-16)

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin and Lee as applied to claim 1 above, and further in view of Carnahan et al. (U.S. Patent 4,175,152).

Lin and Lee disclose all the limitations except for the conductive paste to be DAG. Whereas Carnahan discloses a conductive epoxy to be silver DAG. (Column 10, lines 4-5) Since Lee discloses a conductive paste being epoxy then it would be obvious to combine and make the conductive epoxy silver DAG. The conductive epoxy is silver DAG for its good property of electrical conductivity. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to

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modify the devices of Lin and Lee by incorporating the thermally conductive paste to be DAG for its good electrical conductive properties as taught by Carnahan.

Response to Arguments

Applicant's arguments filed 26 January 2006 have been fully considered but they are not persuasive. Applicants argue that the Lee reference does not disclose a thermally conductive paste stated in the columns disclosed in the previous office action. As stated in the previous office action (12/29/05), Lee discloses thermally conductive paste (epoxy) used to couple a chip and a heat sink shown in Column 4, lines 63-65. These lines disclose the thermally conductive material to be epoxy, which is a thermally conductive paste. Therefore the Lee reference does disclose the thermally conductive paste. In regards to the Lin and Lee references not being able to be combined, this is erroneous since the Lee reference is only disclosing the thermally conductive material being a thermally conductive paste, in addition they are still able to be combined since they both disclose chips and a heat sink and are both in the same field of endeavor.

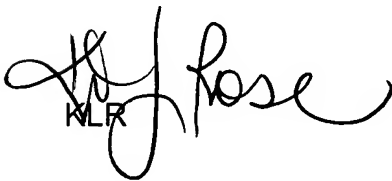
Conclusion

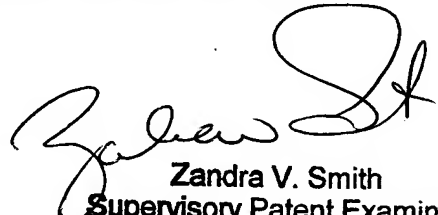
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kiesha L. Rose whose telephone number is 571-272-1844. The examiner can normally be reached on T-F 8:30-6:00 off Mondays.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on 571-272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


KLR


Zandra V. Smith
Supervisory Patent Examiner
April 2006